10-minute consultation

Proteinuria

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This is part of a series of occasional articles on common problems in primary care

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The *BMJ* welcomes contributions from general practitioners to the series

A 40 year old woman comes to you after she was found to have a reading of 2+ on a dipstick proteinuria test at an insurance company medical examination. She is fit and well with no major medical history or family history of illness. She has no urinary symptoms and no oedema. She is not pregnant.

What issues you should cover

Proteinuria may be an early indicator of renal disease and increases the risk of renal impairment, hypertension, and cardiovascular disease. Exclude causes of transient proteinuria (box), which does not have these associations. If proteinuria of 1+ or more persists on two subsequent dipstick tests at weekly intervals further investigation is indicated.

History—Ask about symptoms of renal failure and connective tissue diseases (including arthralgia, mouth ulcers, and rashes). Pertinent past medical history includes a history of diabetes mellitus, cardiac failure, hypertension, or connective tissue diseases. Drug history is important—ask her if she is taking any drugs associated with proteinuria, particularly non-steroidal anti-inflammatories, captopril, or penicillamine. Any family history of polycystic kidney disease, reflux nephropathy, or connective tissue diseases is relevant.

Examination—Look for signs of nephrotic syndrome and multi-system diseases (especially rashes, splinter haemorrhages, and bruits). Measure her blood pressure and repeat the urine dipstick test to check for coexistent microscopic haematuria. If it is present send urine for microscopy.

What you should do

- Exclude the possibility of a urinary tract infection or diabetes mellitus.

Causes of transient and persistent proteinuria

Transient proteinuria
- Urinary tract infection
- Vaginal mucus
- Fever
- Heavy exercise
- Orthostatic proteinuria (occurs after patient has been upright for some time and is not found in early morning urine). Uncommon over age of 30
- Pregnancy

Persistent proteinuria
- Primary renal disease: glomerular (such as glomerulonephritis) or tubular
- Secondary renal disease: diabetes mellitus, connective tissue diseases, vasculitis, amyloidosis, myeloma, congestive cardiac failure, hypertension

Useful reading

Wingo CS, Clapp WL. Proteinuria: potential causes and approach to evaluation. *Am J Med Sci* 2000;320:188-94

US National Kidney Foundation. Clinical practice guidelines. www.kidney.org/professionals/kdoqi/guidelines.cfm

Edinburgh Renal Unit. Asymptomatic proteinuria (information leaflet for patients). http://renux.dmed.ed.ac.uk/EdREN/EdRenINFObits/ProteinuriaLong.html

- Quantify the proteinuria. Simpler than a 24 hour urine collection, and almost as accurate, is to calculate a spot urine protein:creatinine ratio from a single (preferably early morning) urine specimen. The 24 hour urinary protein excretion (mg per 24 hours) can be approximated as (mg/l protein) ÷ (mmol/l creatinine)×10. More than 150 mg in 24 hours (equivalent to a protein:creatinine ratio of 15 mg/mmol) is abnormal. If proteinuria in the nephrotic range (>3.5 g/24 h or a ratio >350) is present, check serum albumin and cholesterol concentrations.
- Assess the renal function. Check serum electrolytes, urea, and creatinine. Creatinine clearance gives a more accurate picture of renal function than creatinine alone and can be calculated from the Cockcroft-Gault formula: creatinine clearance (ml/min) = ((140 – age)×weight (kg)×C) ÷ serum creatinine (μmol/l), where C = 1.23 in men or 1.04 in women. A creatinine clearance of >90 ml/minute can be considered normal. It declines with age so lower values may be normal in elderly people and in people with low muscle mass.
- Refer her to a nephrologist if she has significant proteinuria: >100 mg/mmol, although values >50 mg/mmol may be significant if other features of renal disease are present, such as impaired renal function, coexistent microscopic haematuria, hypertension, or features indicating an underlying systemic disease. Further investigations to consider when referring her include renal tract ultrasonography, immunology (serum and urine protein electrophoresis, antinuclear antibodies, antineutrophil cytoplasmic antibodies, complements), and hepatitis B and C serology.
- If you don't refer her, review her after six months and then annually to reassess quantity of proteinuria, renal function, and blood pressure. Treat any hypertension aggressively with an angiotensin converting enzyme inhibitor or angiotensin II receptor blocker.

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